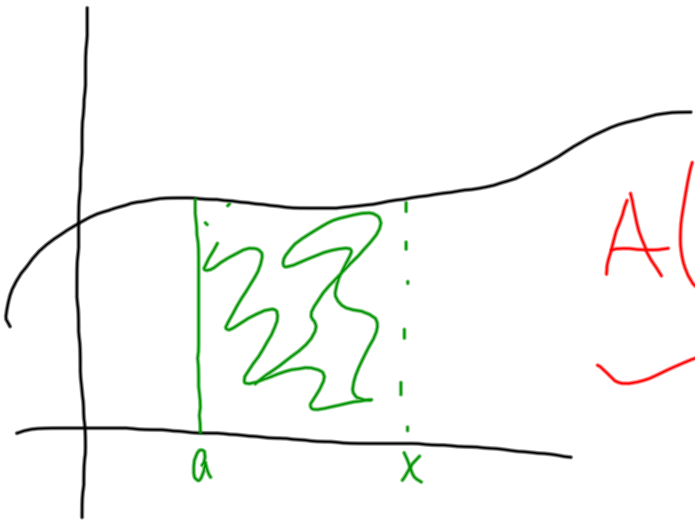
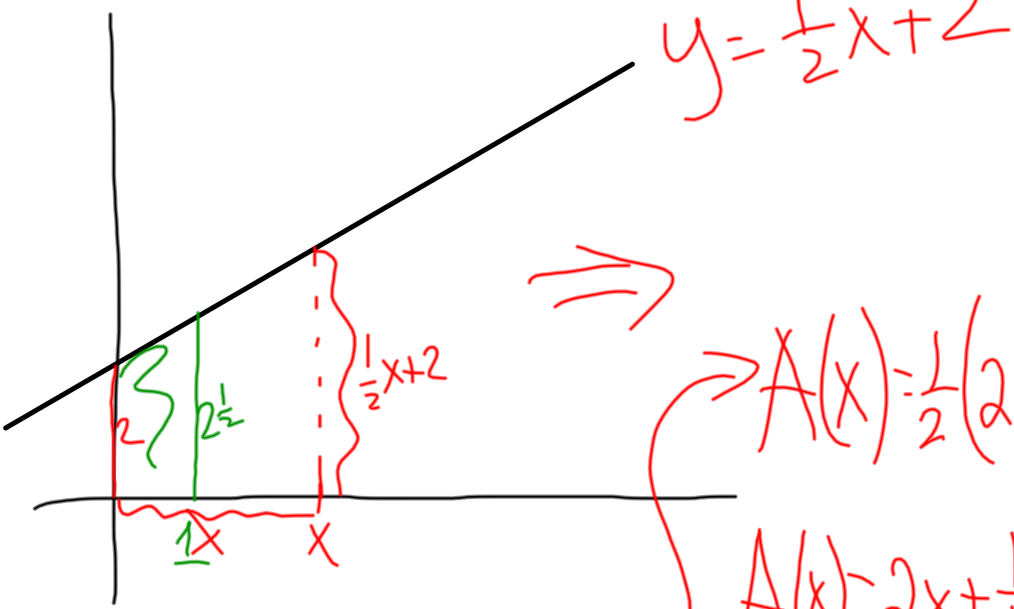
6.1
b



$A(x) =$ Area from a to x under the curve



$\Rightarrow$

$$A(x) = \frac{1}{2}\left(2 + \frac{1}{2}x + 2\right)(x)$$

$$A(x) = 2x + \frac{1}{4}x^2$$

$$A_{trap} = \frac{1}{2}(b_1 + b_2)h$$

$A(0) = 0$ ✓

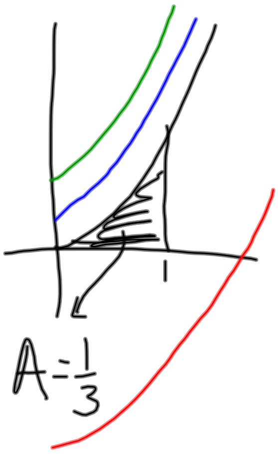
green area =
$$\frac{1}{2}\left(4\frac{1}{2}\right)(1) = 2\frac{1}{4}$$

$A(1) = 2\frac{1}{4}$ ✓

$$A(x) = 2x + \frac{1}{4}x^2$$
$$A'(x) = 2 + \frac{2}{4}x = 2 + \frac{1}{2}x$$

$\Rightarrow$ If an area function $A(x)$ exists then

$A'(x) =$ original function



$$f(x) = x^2$$

$$A(x) = \frac{1}{3}x^3 \text{ ¿}$$

$$A'(x) = x^2$$

$$A(1) = \frac{1}{3}(1)^3 = \frac{1}{3}$$

OMG!

$$B(x) = \frac{1}{3}x^3 + 2 \qquad B'(x) = x^2$$

$$B(1) = \frac{1}{3}(1)^3 + 2 = 2\tfrac{1}{3} \text{ "?"}$$

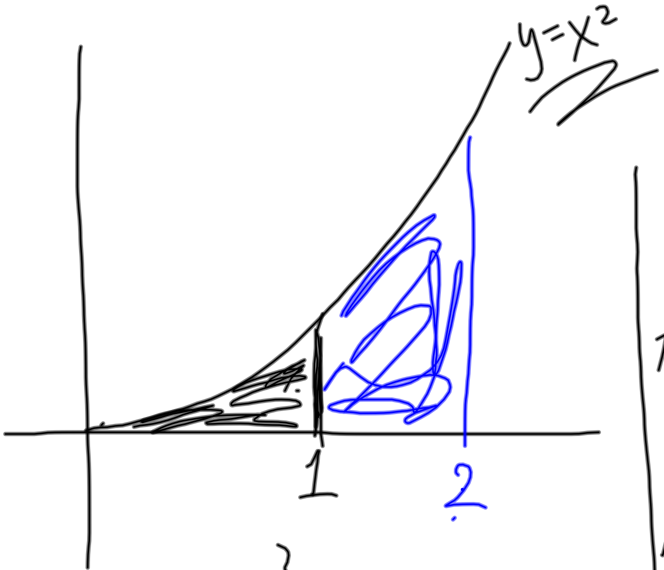
$$y = x^2$$

$$A(x) = \frac{1}{3}x^3 + C$$

$$0 = A(0) = \frac{1}{3}(0)^3 + C \quad \therefore C = 0$$

the "correct" one is $A(x) = \frac{1}{3}x^3 + 0$

$$A(x) = \frac{x^3}{3} + Bx + C$$



$$A(x) = \frac{x^3}{3} + C$$

$$0 = A(1) = \frac{1^3}{3} + C$$

$$\therefore C = -\frac{1}{3}$$

$$A(x) = \frac{x^3}{3} - \frac{1}{3}$$

$$A(x) = \frac{x^3}{3}$$

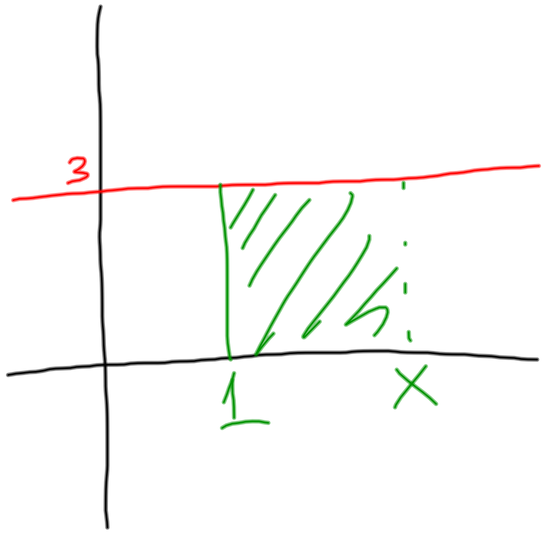
$$A(2) = \frac{8}{3}$$

$$A(1) = \frac{1}{3}$$

$$A\left(\begin{matrix}\text{between } x=1 \\ \& \ x=2\end{matrix}\right) = \frac{7}{3}$$

6.1/9

$f(x)=3$; $[1,x]$



$A(x)=3(x-1)$

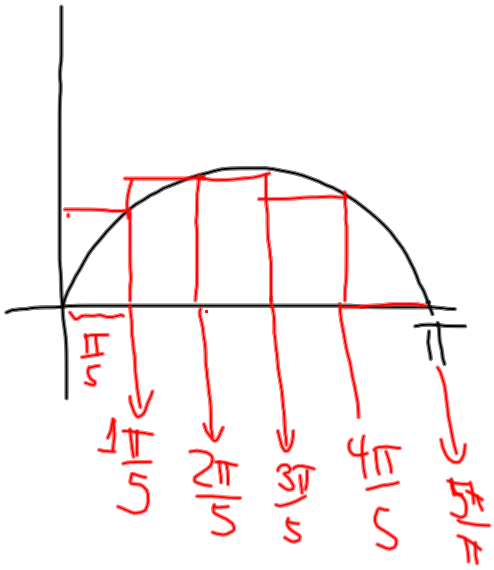
$A(x)=3x-3$

$A'(x)=3$ ✓✓

$=$

6.1/10-14

6.1/3) $f(x) = \sin(x)$



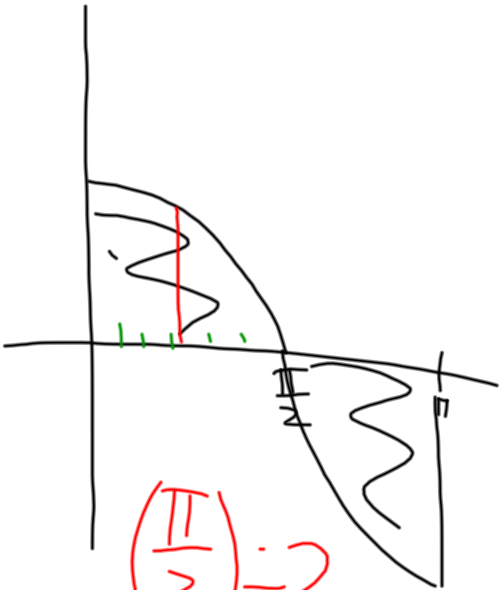
$$A = \left(\frac{\pi}{5}\right)\left(\sin\left(\frac{1\pi}{5}\right)\right) + \left(\frac{\pi}{5}\right)\left(\sin\left(\frac{2\pi}{5}\right)\right) + \left(\frac{\pi}{5}\right)\left(\sin\left(\frac{3\pi}{5}\right)\right) + \left(\frac{\pi}{5}\right)\left(\sin\left(\frac{4\pi}{5}\right)\right) + \left(\frac{\pi}{5}\right)\left(\sin\left(\frac{5\pi}{5}\right)\right)$$

$$\sum_{K=1}^{5} \left(\frac{\pi}{5}\right)\left(\sin\frac{K\pi}{5}\right)$$

$$\mathrm{sum}\left(\mathrm{seq}\left(\left(\frac{\pi}{5}\right)\left(\sin\frac{X\pi}{5}\right), X, 1, 5\right)\right)$$

$$\approx 1.934$$

$\int$



$\left(\frac{\pi}{2}\right) \div 2$

$$\sum_{k=1}^{\overset{n}{\|}\,10} \left(\frac{\pi}{2}\right)\left(\frac{1}{\underset{\overset{\|}{n}}{10}}\right)\cos\left[\frac{\pi}{2}\cdot\frac{1}{\underset{\overset{\|}{n}}{10}}\cdot k\right]$$

Area $\}$ +

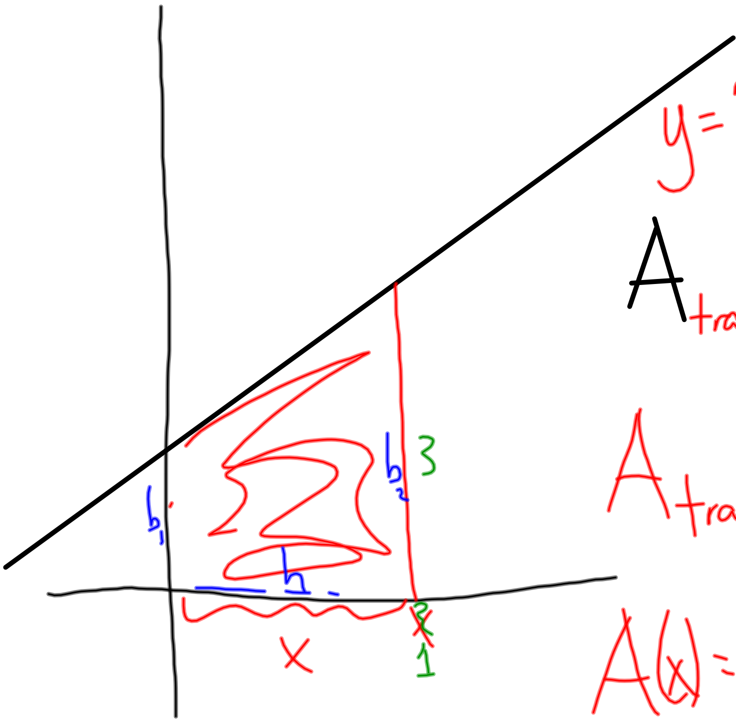
Definite Integral $\}$ + or − (depend on function)

http://math.exeter.edu/rparris/winplot.html

Click on Winplot to download this small awesome graphing program for free

6.1
b

A(x) = area under the curve from x=0 to x.



$y = 2x+1$

$A_{trap} = \frac{1}{2}(b_1+b_2)h$

$A_{trap} = \frac{1}{2}(1+(2x+1))(x)$

$A(x) = x + x^2$

$A(0) = 0$

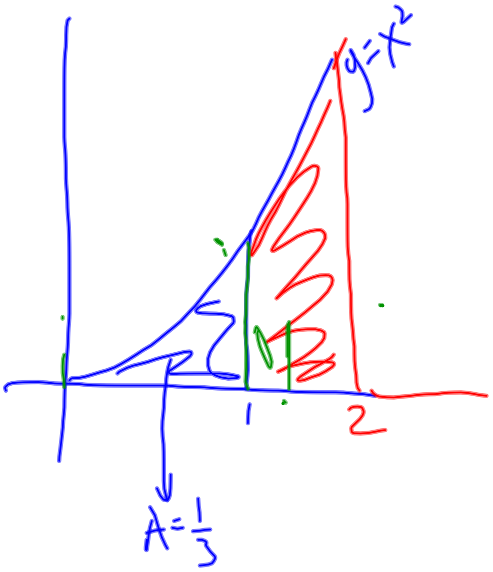
$A(1) = \frac{1}{2}(1+3)(1) = 2$

$A'(x) = 1+2x$

The pointe :

If I have an area function

then $A'(x) = $ original f^n



$A(x) = \frac{1}{3}x^3 \qquad A'(x) = x^2$

$A(0) = \frac{1}{3}(0)^3 = 0$ ✓

$A(1) = \frac{1}{3}(1)^3 = \frac{1}{3}$ ✓

there is another fn w/ deriv = x^2

$B(x) = \frac{1}{3}x^3 + 2$

$B(0) = 2$?

geometrically

$A_{red} = A(2) - A(1)$

$= \frac{8}{3} - \frac{1}{3} = \frac{7}{3}$

there is an entire family of fns. whose derivative is x^2

$A(x) = \frac{1}{3}x^3 + C$

$0 = A(1) = \frac{1}{3}(1)^3 + C \qquad \frac{7}{3} = A(2) = \frac{1}{3}(2^3) - \frac{1}{3} = \frac{7}{3}$

$\therefore C = -\frac{1}{3}$

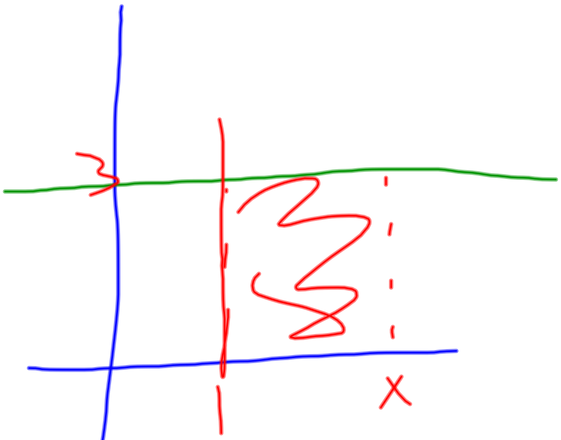
$A(x) = \frac{1}{3}x^3 - \frac{1}{3}$

Q:

$$\left.\begin{array}{l}\text{Geometry}\\ \text{Area}\end{array}\right\} +$$

$$\left.\begin{array}{l}\text{Area}\\ \text{fn}\end{array}\right\} +, 0, -$$

6.1/9 $f(x) = 3$; $[1, x]$



$A(x) = (x-1)(3)$

$= 3x - 3$

$A'(x) = 3$ ✓

6.1/10-14